Guidelines for Calculating and Reporting Emissions from Bulk Loading Operations

December 2014

The purpose of this document is to provide operators with guidelines in estimating emissions from loading of volatile organic containing liquid materials in bulk. Loading losses are the primary source of evaporative emissions that occur as organic vapors in "empty" cargo tanks are displaced to the atmosphere by the liquid being loaded into the tanks. These vapors are a composite of: (1) vapors formed in the empty tank by evaporation of residual product from previous loads, (2) vapors transferred to the tank in vapor balance systems as product is being unloaded, and (3) vapors generated in the tank as the new product is being loaded.

In addition to VOC emissions from evaporative losses, other emissions (NOx, SOx, CO, PM, and toxic air contaminants), from controlling VOC emissions by means of thermal destruction are also expected.

The following guidelines should be used to calculate annual emissions from bulk loading operations. The methodologies assume certain default parameters. Site-specific information should be used, if it is available. There are three emission scenarios for bulk loading operations:

1. Simple Operation (No Control)
2. Equipped with a Vapor Collection and Recovery System
3. Equipped with a Balance System and Vapor Control System

CASE 1) SIMPLE OPERATION (NO VAPOR CONTROL)

$$E_1 = Q * L_L \qquad \textit{Eq. 1}$$

Where,

E_1 = VOC Emission (un-captured vapor) from Loading Losses

Q = Throughput in 1,000 gallons loaded

L_L = Loading Loss Factor (lbs/1,000 Gallon Loaded) can be found in the Default Emission Factor tables or determined using information dfined in US EPA AP-42, Section 5.2 as follows:

$$L_L = \frac{12.46 \times S \times P \times M}{T}$$

Where,

S = Saturation Factor (see AP-42, Table 5.2-1)

P = True Vapor Pressure, psia

M = Vapor Molecular Weight, lb/lb-mole

T = Temperature of the Liquid being Loaded, °R (°F + 460)

CASE 2) OPERATIONS EQUIPPED WITH VAPOR COLLECTION AND RECOVERY SYSTEMS

Loading emissions from this configuration consist of two parts: 1) uncollected vapor during loading; and 2) collected vapor that was further recovered by the system before exiting the recovery stack.

$$E_2 = E_{uncollected} + E_{stack} = E_{uncollected} + E_{collected} * (1 - Eff_{VR})$$

$$E_2 = Q * L_L * (1 - Eff_{VC}) + Q * L_L * Eff_{VC} * (1 - Eff_{VR})$$

$E_2 = Q * L_L - Q * L_L * Eff_{VC} * Eff_{VR}$	*Eq. 2*

Where,

E_2 = VOC Emission from Loading Losses

Eff_{VR} = Vapor Recovery Efficiency (fraction)

Eff_{VC} = Vapor Collection Efficiency (fraction) as defined in US EPA AP-42, Section 5.2 as follows:

Eff_{VC} = 0.992 for tanker trucks passing MACT-level annual leak test; or

Eff_{VC} = 0.987 for tanker trucks passing the NSPS-level annual leak test; or

Eff_{VC} = 0.70 for tanker trucks not passing either of the above leak tests.

Without specific tests, Vapor Recovery Efficiency (Eff_{VR}) is assumed to be 0.95 and equation 2 becomes:

$E_2 = Q * L_L * (1 - 0.95 * Eff_{VC})$	*Eq. 3*

CASE 3) OPERATIONS EQUIPPED WITH A VAPOR BALANCE AND DESTRUCTION SYSTEM

Loading emissions from this configuration consisted of two parts: 1) uncollected vapor during loading; and 2) collected vapor that was further recovered by the system before exiting the recovery stack.

$$E_3 = E_{uncollected} + E_{stack} = E_{uncollected} + E_{collected} * (1 - Eff_{VB}) * (1 - Eff_{VD})$$

$$E_3 = Q * L_L * (1 - Eff_{VC}) + Q * L_L * Eff_{VC} * (1 - Eff_{VB}) * (1 - Eff_{VD})$$

$E_3 = Q * L_L * [1 - Eff_{VC} (Eff_{VB} + Eff_{VD} - (Eff_{VB} * Eff_{VD}))]$	*Eq. 4*

Where,

E_3 = VOC Emission from Loading Losses

Eff_{VC} = Vapor Collection Efficiency (fraction) as defined in US EPA AP-42, Section 5.2

Eff_{VB} = Vapor Balance Efficiency (fraction)

Eff_{VD} = Vapor Destruction Efficiency (fraction)

A typical system is operating with Vapor Balance Efficiency (Eff_{VB}) of 50% (or 0.50). Without specific tests, Vapor Destruction Efficiency (Eff_{VD}) is assumed to be 99% (or 0.99) and equation 4 becomes:

$$E_3 = Q * L_L * (1 - 0.995 * Eff_{VC}) \qquad Eq.\ 5$$

THERMAL OXIDATION

If the operation is equipped with a VOC destruction system by means of thermal oxidation, other contaminants (NOx, SOx, CO, PM, and toxic air contaminants) resulted from burning off organic vapor are expected. AQMD encourages operators to use test results to calculate and report emissions. Since the organic vapor evaporates from loading of liquid organic materials, the captured for control vapor must be converted back into liquid form for consistency in emission calculations. The AQMD uses an equivalent method to determine the throughput of vapors directed to a thermal oxidizer (TO) as equivalent 1000 of gallons of liquid (Mgal).

$$TO_{Throughput} = \frac{E_{collected}}{1{,}000 * d_l} * (1 - Eff_{VB})$$

$$TO_{Throughput} = \frac{Q * L_L * Eff_{VC}}{1{,}000 * d_l} * (1 - Eff_{VB}) \qquad Eq.6$$

A typical system is operating with Vapor Balance Efficiency (Eff_{VB}) of 50% (or 0.50). Throughput for the TO become:

$$TO_{Throughput} = 0.0005 * Eff_{VC} * \frac{Q * L_L}{d_l} \qquad Eq.\ 7$$

Where, d_l is the liquid density.

EXAMPLES

The following examples will demonstrate how emissions are calculated for a typical bulk loading operation in all three cases. The examples also included images of screens for how to report emissions under the new reporting system.

CASE 1 - SIMPLE OPERATION (NO VAPOR CONTROL)

Company XYZ splash loaded 120,000 gallons of gasoline RVP 10 at the following conditions:

S = 1.45 (Saturation Factor from AP-42)

T = 70ºF = 530ºR (Temperature of Gasoline)

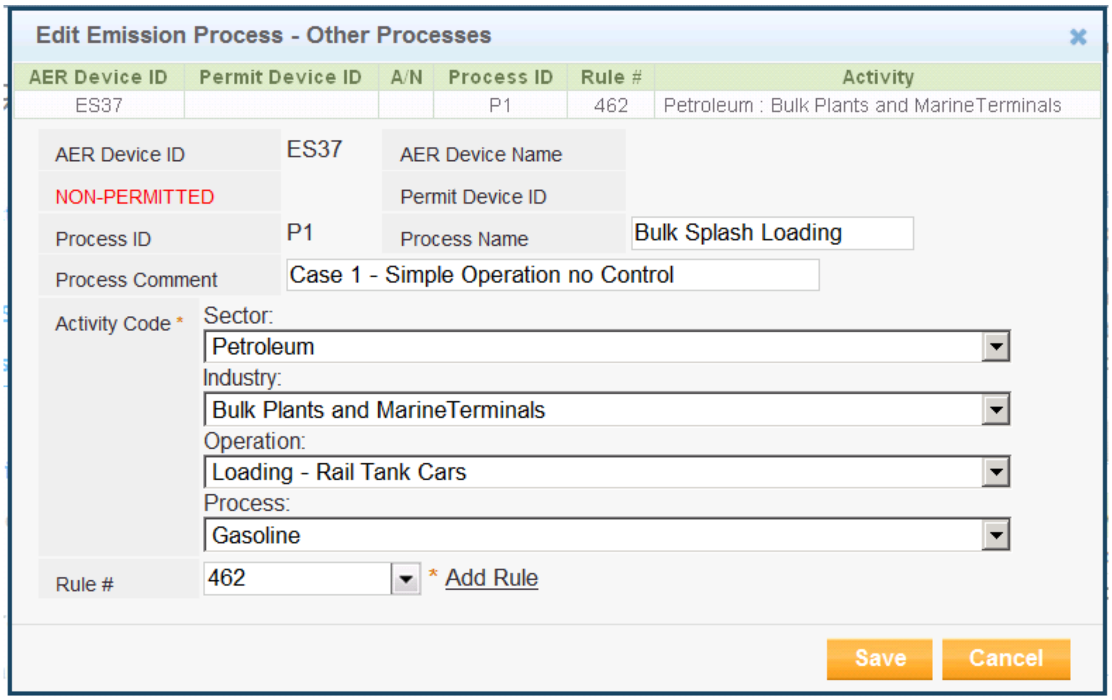
P = 6.2 psia (True Vapor Pressure)

M = 66 lb/lb-mole (Vapor Molecular Weight)

$$L_L = \frac{12.46 \times S \times P \times M}{T} = \frac{12.46 \times 1.45 \times 6.2 \times 66}{530} = 13.95\ lbs\ VOC/Mgal$$

Equation 1 yields the VOC emissions as follows:

$$\boxed{E_1 = 120\ Mgals * 13.95 \frac{lbs\ VOC}{Mgal} = 1{,}674\ lbs\ VOC}$$



Edit Emission Process - Other Processes

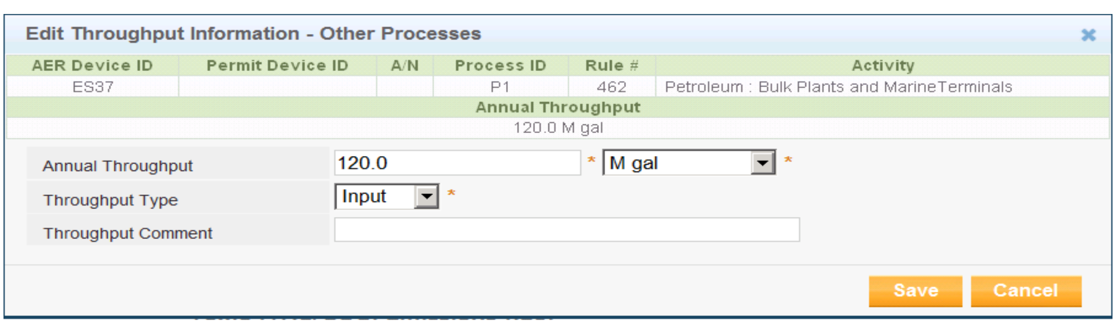
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals

AER Device ID	ES37	AER Device Name	
NON-PERMITTED		Permit Device ID	
Process ID	P1	Process Name	Bulk Splash Loading
Process Comment	Case 1 - Simple Operation no Control		

Activity Code *
Sector: Petroleum
Industry: Bulk Plants and MarineTerminals
Operation: Loading - Rail Tank Cars
Process: Gasoline

Rule # 462 * Add Rule

Save Cancel



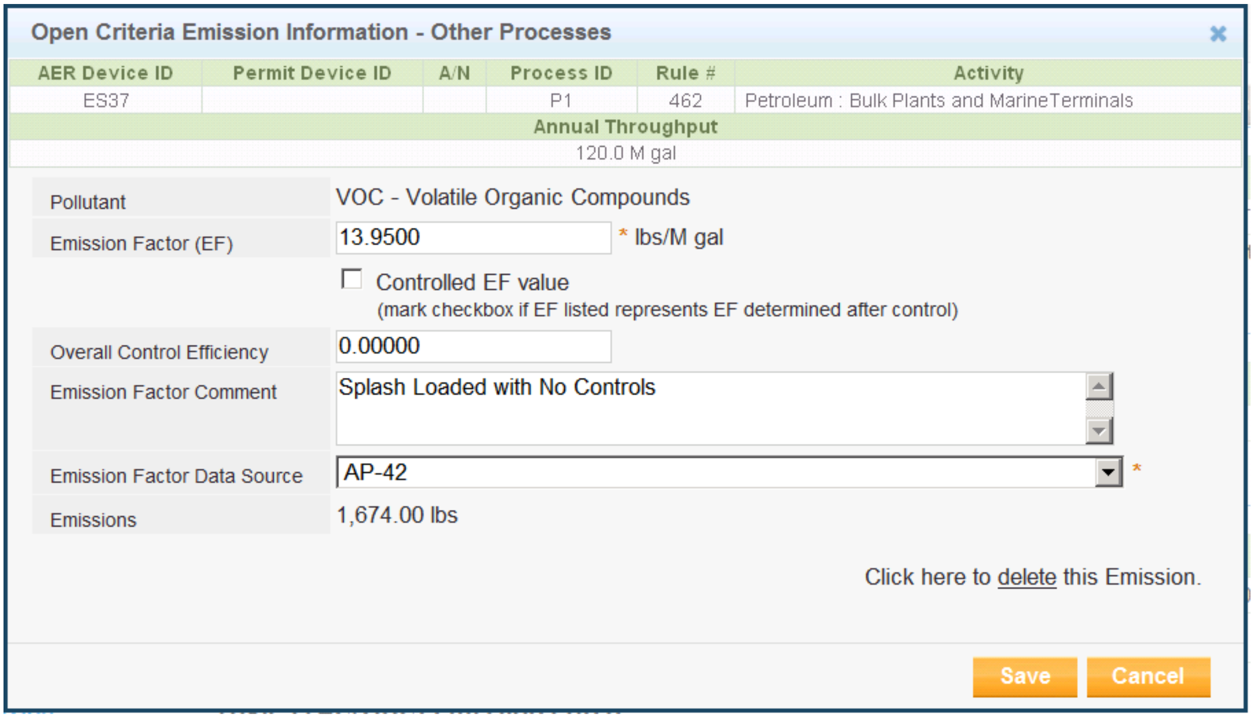
Edit Throughput Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals

Annual Throughput
120.0 M gal

Annual Throughput	120.0 * M gal *
Throughput Type	Input *
Throughput Comment	

Save Cancel



Open Criteria Emission Information - Other Processes

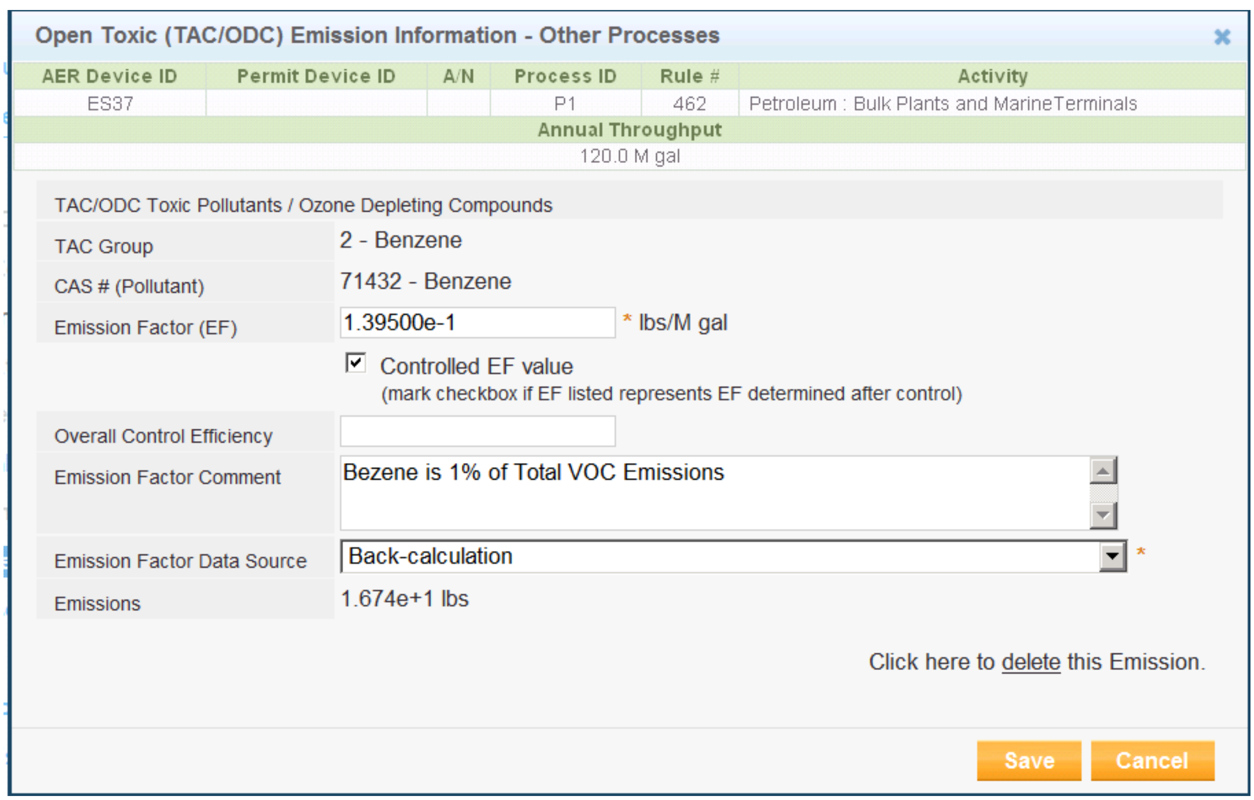
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals

Annual Throughput
120.0 M gal

Pollutant	VOC - Volatile Organic Compounds
Emission Factor (EF)	13.9500 * lbs/M gal
	☐ Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	0.00000
Emission Factor Comment	Splash Loaded with No Controls
Emission Factor Data Source	AP-42 *
Emissions	1,674.00 lbs

Click here to delete this Emission.

Save Cancel



Open Toxic (TAC/ODC) Emission Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals

Annual Throughput
120.0 M gal

TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

TAC Group	2 - Benzene
CAS # (Pollutant)	71432 - Benzene
Emission Factor (EF)	1.39500e-1 * lbs/M gal
	☑ Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	
Emission Factor Comment	Bezene is 1% of Total VOC Emissions
Emission Factor Data Source	Back-calculation *
Emissions	1.674e+1 lbs

Click here to delete this Emission.

Save Cancel

CASE 2 - OPERATIONS EQUIPPED WITH VAPOR COLLECTION AND RECOVERY SYSTEMS

Company ABC operates a loading terminal with vapor balance service with submerged bottom filling technology into tanker trucks that have passed the MACT level leak test. The vapor vent line is connected to a refrigeration unit that recovers 95% of the vapor and returns it back as liquid to storage tank. ABC transferred 1,000,000 gallons of RVP 10 gasoline over the year at the following conditions:

S = 1.0 (Saturation Factor from AP-42)

T = 70ºF = 530ºR (Temperature of Gasoline)

P = 6.2 psia (True Vapor Pressure)

M = 66 lb/lb-mole (Vapor Molecular Weight)

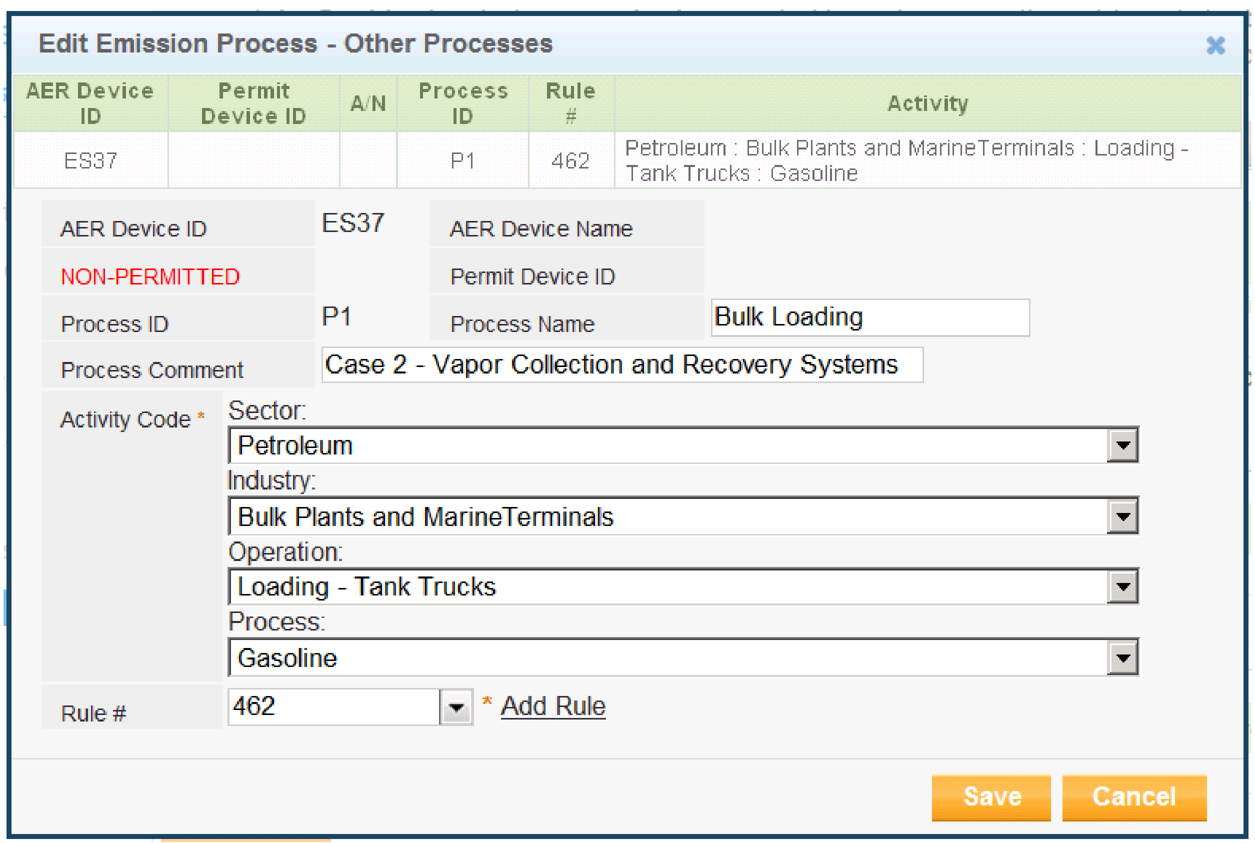
Eff_{VR} = 0.95 (Vapor Recovery Efficiency)

Eff_{VC} = 0.992 (Vapor Collection Efficiency)

$$L_L = \frac{12.46 \times S \times P \times M}{T} = \frac{12.46 \times 1 \times 6.2 \times 66}{530} = 9.62\ lb\ VOC/Mgal$$

Equation 3 yields the VOC emissions as follows:

$$\boxed{E_2 = 1{,}000\ Mgals * 9.62\ \frac{lbs\ VOC}{Mgal} * (1 - 0.95 * 0.992) = 554\ lbs\ VOC}$$

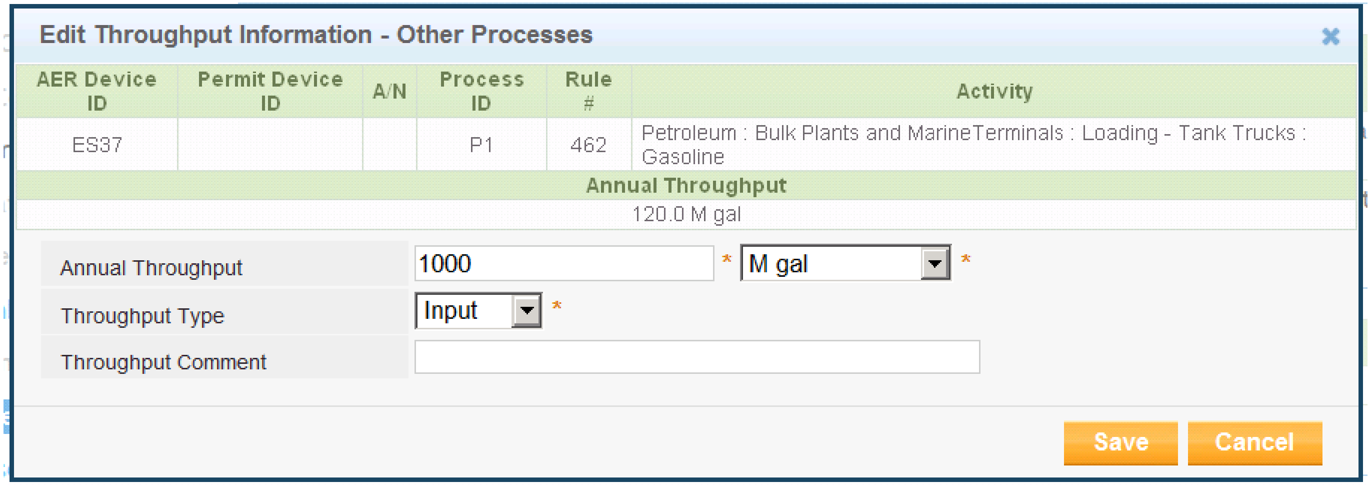


Edit Emission Process - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

AER Device ID: ES37
AER Device Name:
NON-PERMITTED
Permit Device ID:
Process ID: P1
Process Name: Bulk Loading
Process Comment: Case 2 - Vapor Collection and Recovery Systems
Activity Code *
Sector: Petroleum
Industry: Bulk Plants and MarineTerminals
Operation: Loading - Tank Trucks
Process: Gasoline
Rule #: 462 * Add Rule

Save Cancel



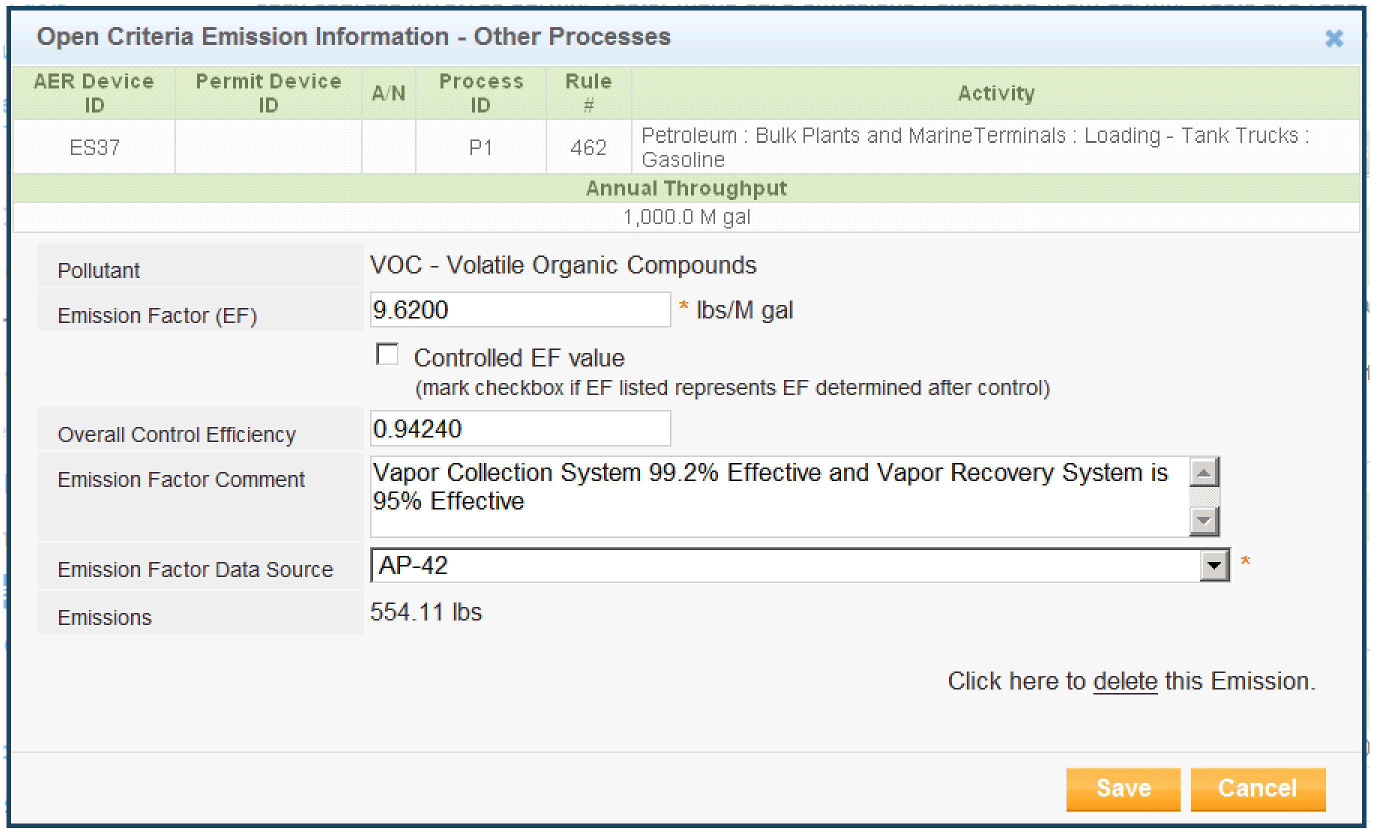
Edit Throughput Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

Annual Throughput
120.0 M gal

Annual Throughput	1000 * M gal *
Throughput Type	Input *
Throughput Comment	

Save Cancel



Open Criteria Emission Information - Other Processes

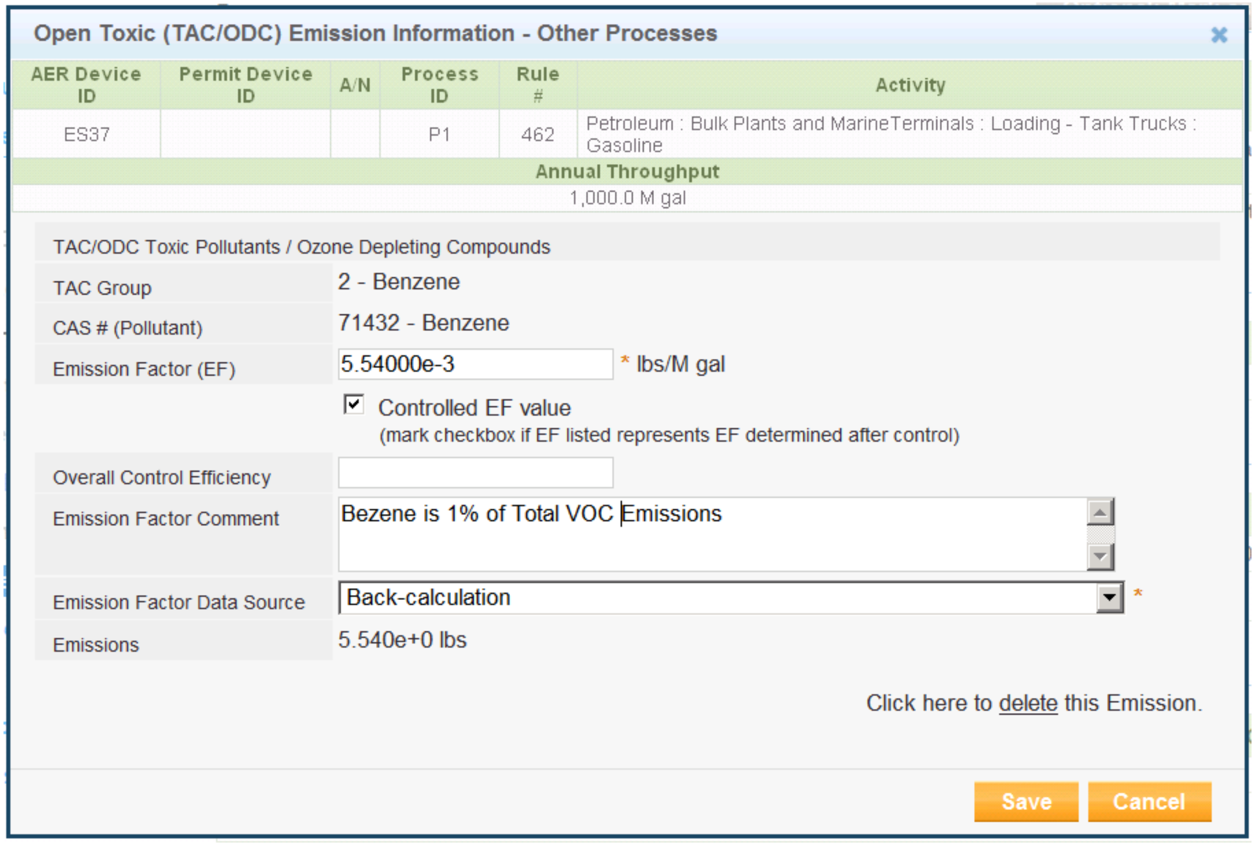
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

Annual Throughput
1,000.0 M gal

Pollutant	VOC - Volatile Organic Compounds
Emission Factor (EF)	9.6200 * lbs/M gal
	Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	0.94240
Emission Factor Comment	Vapor Collection System 99.2% Effective and Vapor Recovery System is 95% Effective
Emission Factor Data Source	AP-42 *
Emissions	554.11 lbs

Click here to delete this Emission.

Save Cancel


Open Toxic (TAC/ODC) Emission Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

Annual Throughput

1,000.0 M gal

TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

TAC Group	2 - Benzene
CAS # (Pollutant)	71432 - Benzene
Emission Factor (EF)	5.54000e-3 * lbs/M gal
	Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	
Emission Factor Comment	Bezene is 1% of Total VOC Emissions
Emission Factor Data Source	Back-calculation *
Emissions	5.540e+0 lbs

Click here to delete this Emission.

Save Cancel

CASE 3 - OPERATIONS EQUIPPED WITH A VAPOR BALANCE AND DESTRUCTION SYSTEM

Over the year, company RST operates a loading terminal with submerged bottom filling 125,000,000 gallons of gasoline RVP 10 into tanker trucks that have passed the MACT level leak test at the same conditions as Case 2. The vapor vent line is connected to a system of vapor balance and then to an afterburner (thermal oxidizer -TO). The system of vapor balance achieves an overall efficiency of 49%. The oxidizer operates at 99.4% destruction efficiency.

L_L = $9.62\ lb\ VOC/Mgal$ (see Case 2 studies for loading loss factor calculation)

Q = 125,000 Mgals

Eff_{VC} = 0.992 (Vapor Collection Efficiency)

Eff_{VB} = 0.49 (Vapor Balance Efficiency)

Eff_{VD} = 0.994 (Vapor Destruction Efficiency)

Equation 4 yields the VOC emissions as follows:

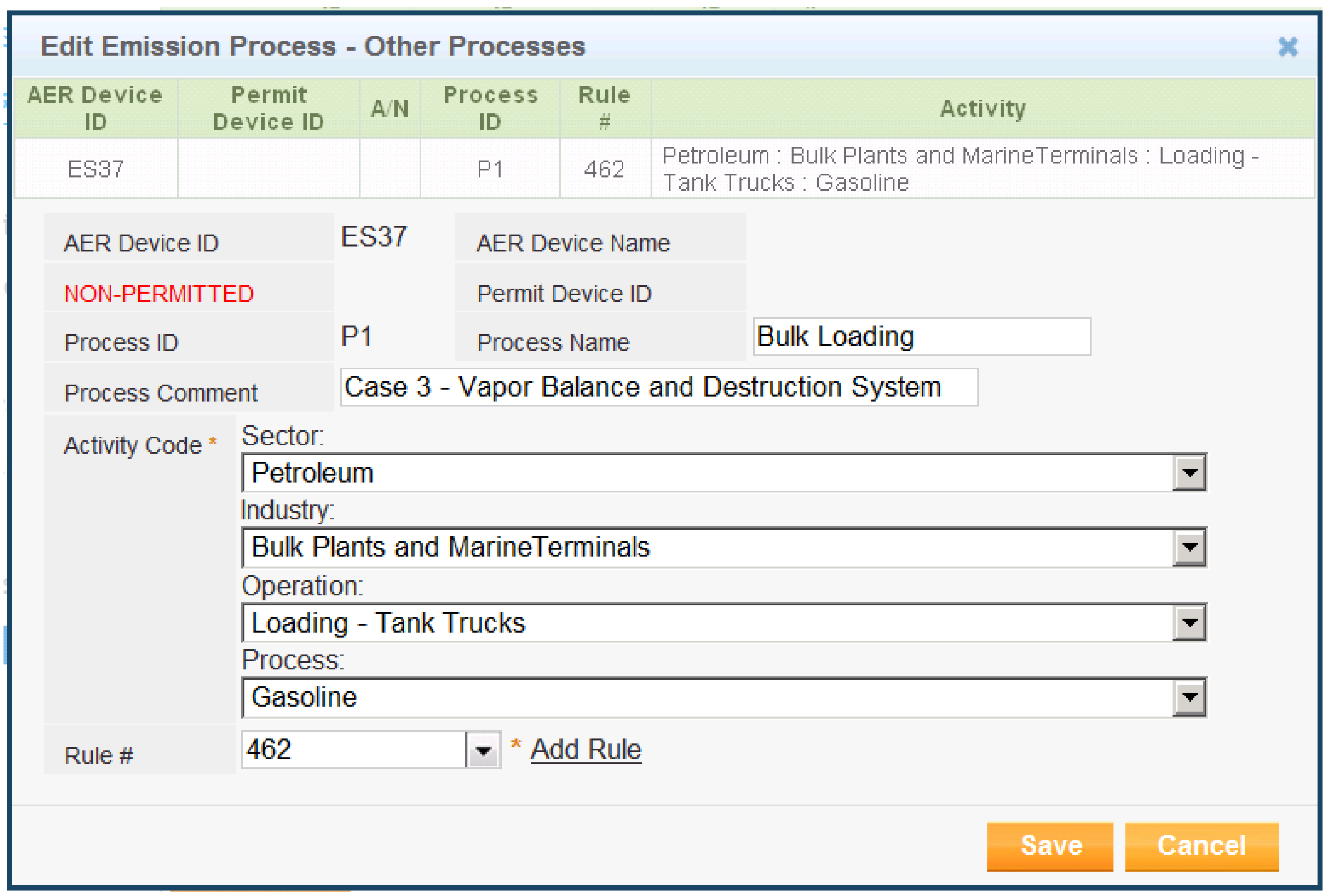
$$E_3 = 125{,}000\ Mgals * 9.62\ \frac{lbs\ VOC}{Mgal} * [1 - 0.992 * (0.49 + 0.994 - (0.49 * 0.994))] = 13{,}276\ lbs\ VOC$$

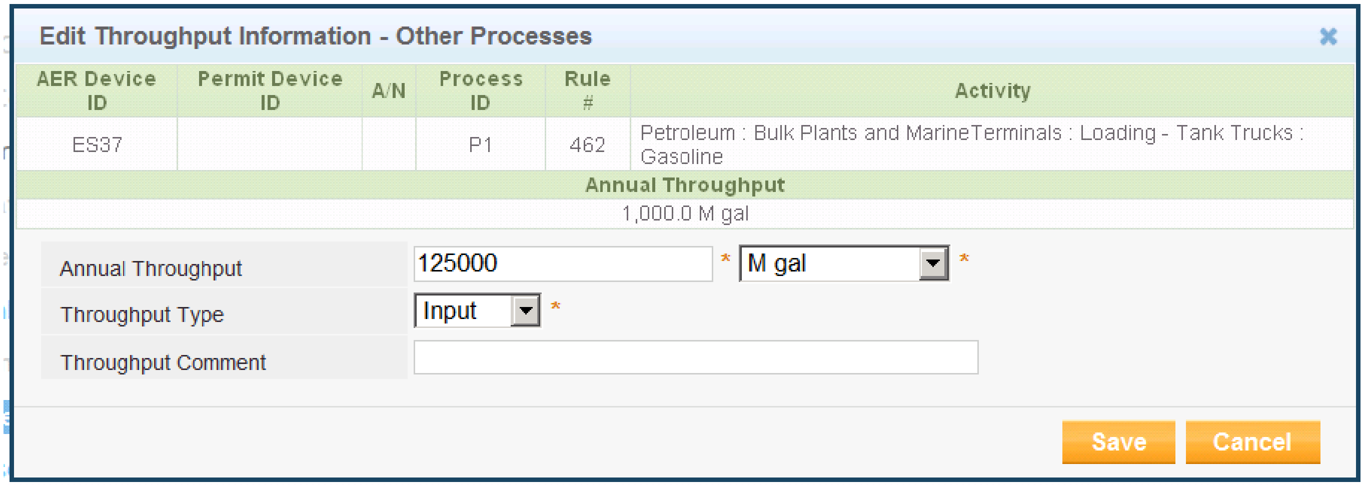
COMBUSTION EMISSIONS FROM THERMAL OXIDIZER (TO)

All thermal oxidizers used at bulk loading facilities are required to have a CARB Certification Test. In some cases, NOx, SOx, CO, and PM emission rates are tested and determined in terms of lbs of pollutant/Mgal material loaded. AQMD encourages operator to use the test results in calculating and reporting emissions.

In this example, other contaminants were not tested for the TO. Emissions for other air contaminants are calculated using the best available default factors published in AER Program Help & Support. Throughput for the TO is determined using Equation 5 as follows for gasoline RVP 10 with liquid density of 5.6 lbs/gallon:

$$TO_{Throughput} = \frac{125{,}000 * 9.62 * 0.992}{1{,}000 * 5.6} * (1 - 0.49) = 108.64\ Mgals\ of\ gasoline$$





Edit Throughput Information - Other Processes

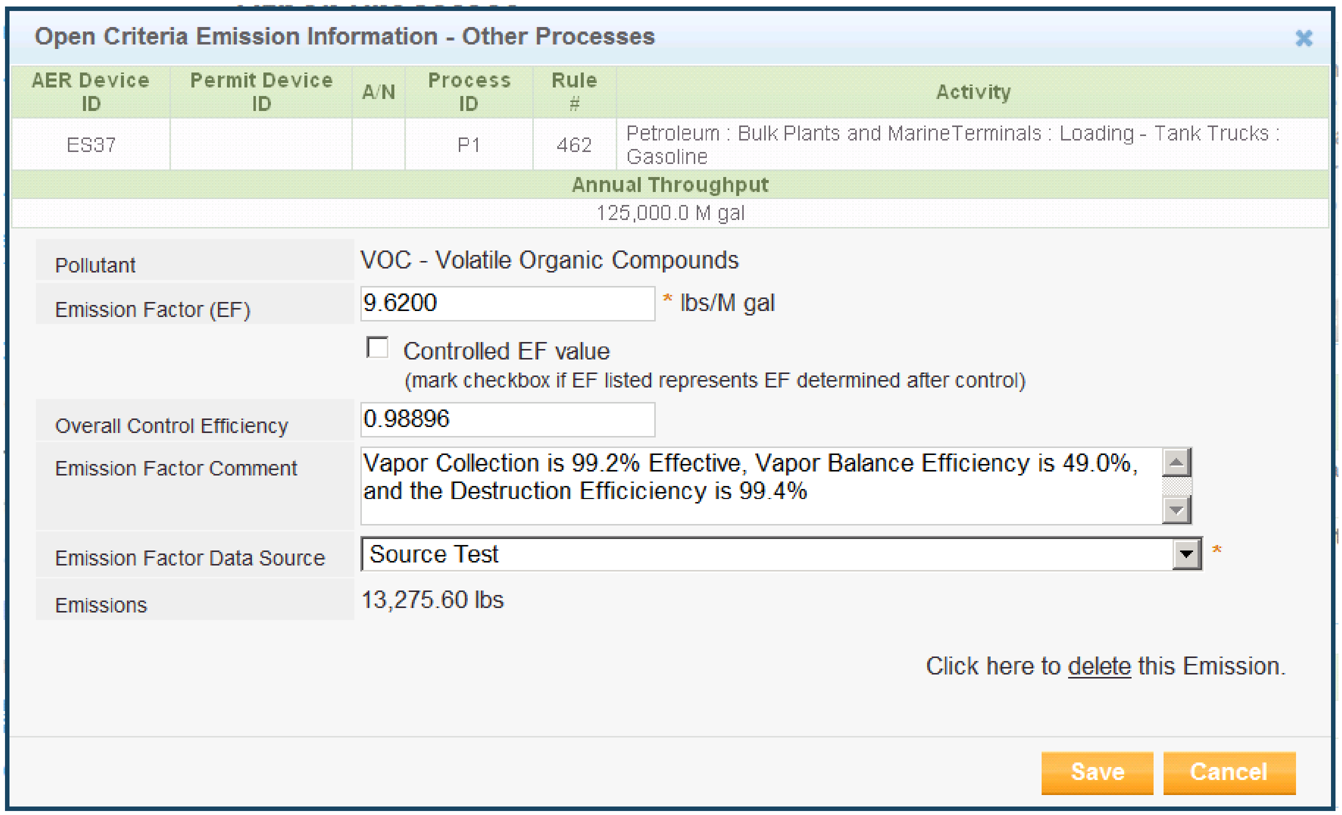
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

Annual Throughput

1,000.0 M gal

Annual Throughput	125000 * M gal *
Throughput Type	Input *
Throughput Comment	

Save Cancel



Open Criteria Emission Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

Annual Throughput

125,000.0 M gal

Pollutant	VOC - Volatile Organic Compounds
Emission Factor (EF)	9.6200 * lbs/M gal
	Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	0.98896
Emission Factor Comment	Vapor Collection is 99.2% Effective, Vapor Balance Efficiency is 49.0%, and the Destruction Efficiciency is 99.4%
Emission Factor Data Source	Source Test *
Emissions	13,275.60 lbs

Click here to delete this Emission.

Save Cancel

Open Criteria Emission Information - External Combustion

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	VOC - Volatile Organic Compounds
Emission Factor (EF)	0.00 * lbs/M gal
Emission Factor Comment	Emissions Already Included in Process ID P1
Emission Factor Data Source	Other *
Emissions	0.00 lbs

Save Cancel

Open Toxic (TAC/ODC) Emission Information - Other Processes

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Activity
ES37			P1	462	Petroleum : Bulk Plants and MarineTerminals : Loading - Tank Trucks : Gasoline

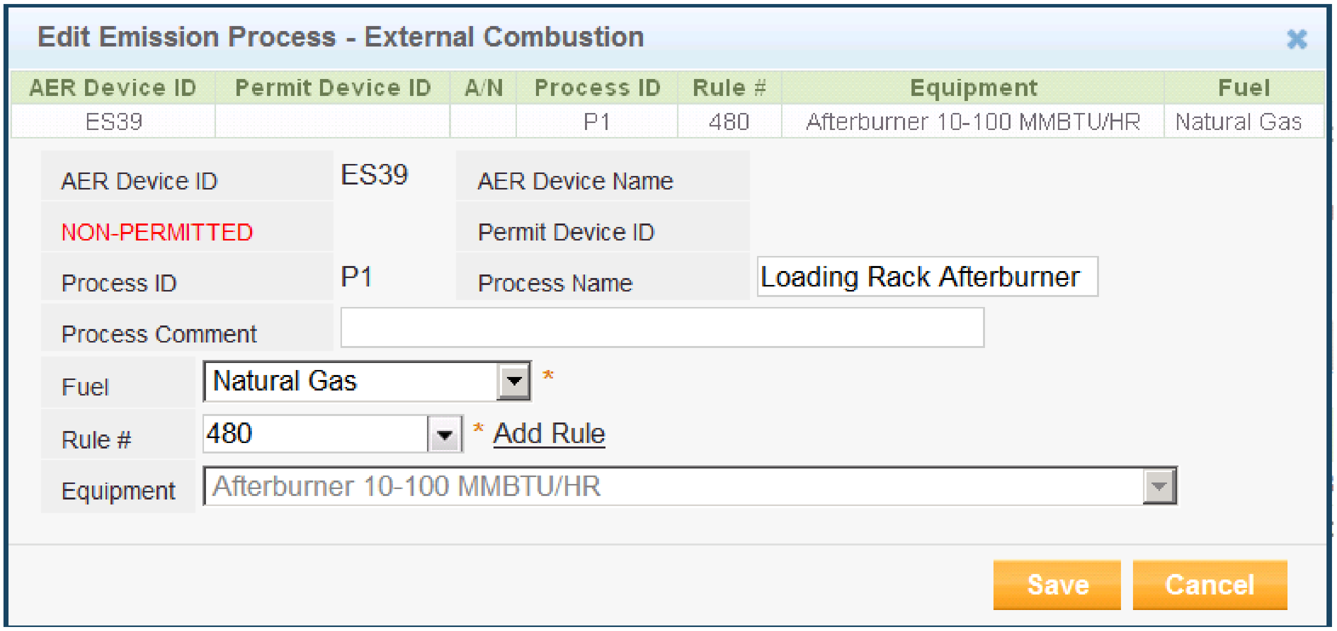
Annual Throughput
125,000.0 M gal

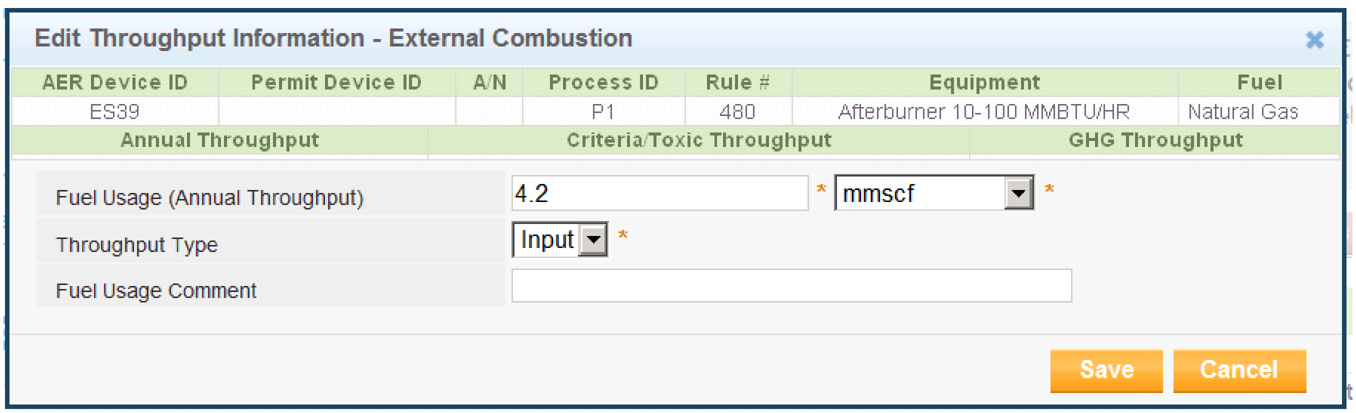
TAC/ODC Toxic Pollutants / Ozone Depleting Compounds

TAC Group	2 - Benzene
CAS # (Pollutant)	71432 - Benzene
Emission Factor (EF)	1.06200e-3 * lbs/M gal
	☑ Controlled EF value (mark checkbox if EF listed represents EF determined after control)
Overall Control Efficiency	
Emission Factor Comment	Bezene is 1% of Total VOC Emissions
Emission Factor Data Source	Back-calculation *
Emissions	1.328e+2 lbs

Click here to delete this Emission.

Save Cancel





Report Criteria and toxic compounds using default factors as below:

Criteria Emissions (lbs)

	Pollutant	EF	Unit	EF Data Source	Overall CE	Emissions
Open	VOC	7.00	lbs / mmscf	AQMD default		29.40
Open	NOx	130.00	lbs / mmscf	AQMD default		546.00
Open	SOx	0.60	lbs / mmscf	AQMD default		2.52
Open	CO	35.00	lbs / mmscf	AQMD default		147.00
Open	PM	7.50	lbs / mmscf	AQMD default		31.50

Toxic (TAC/ODC) Emissions (lbs)

	TAC/ODC Group	CAS #	EF	Unit	EF Data Source	Overall CE	Emissions
Open	Benzene	71432	5.80000e-3	lbs / mmscf	AQMD default		2.436e-2
Open	Formaldehyde	50000	1.23000e-2	lbs / mmscf	AQMD default		5.166e-2
Open	PAHs [PAH, POM]	1151	1.00000e-4	lbs / mmscf	AQMD default		4.200e-4
Open	PAHs [PAH, POM]	91203	3.00000e-4	lbs / mmscf	AQMD default		1.260e-3
Open	Acetaldehyde	75070	3.10000e-3	lbs / mmscf	AQMD default		1.302e-2
Open	Acrolein	107028	2.70000e-3	lbs / mmscf	AQMD default		1.134e-2
Open	Ammonia	7664417	1.80000e+1	lbs / mmscf	AQMD default		7.560e+1
Open	Ethyl benzene	100414	6.90000e-3	lbs / mmscf	AQMD default		2.898e-2
Open	Hexane	110543	4.60000e-3	lbs / mmscf	AQMD default		1.932e-2
Open	Toluene	108883	2.65000e-2	lbs / mmscf	AQMD default		1.113e-1
Open	Xylenes	1330207	1.97000e-2	lbs / mmscf	AQMD default		8.274e-2

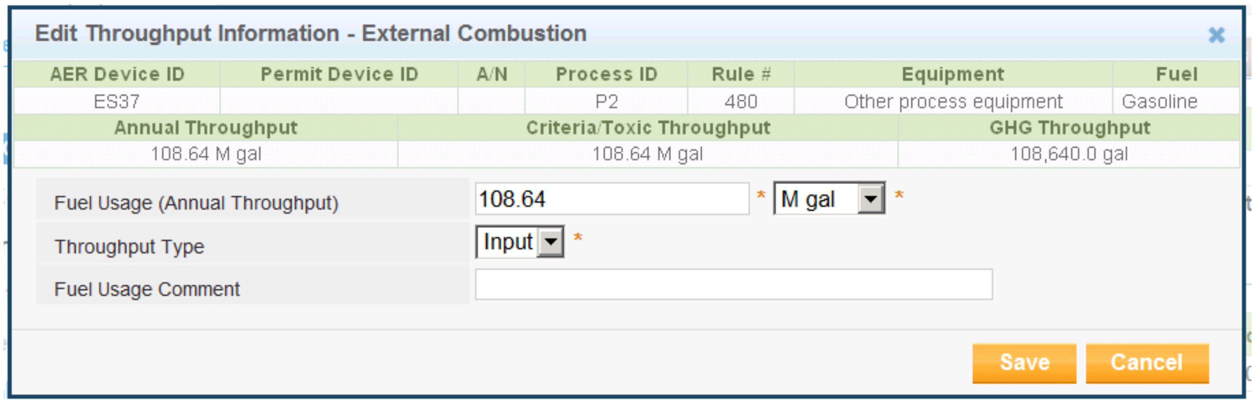
Add New

Edit Emission Process - External Combustion

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

AER Device ID	ES37	AER Device Name	
NON-PERMITTED		Permit Device ID	
Process ID	P2	Process Name	Loading Rack Afterburner
Process Comment	Emissions from Burning Gasoline Vapor		
Fuel	Gasoline *		
Rule #	480 * Add Rule		
Equipment	Other process equipment		

Save Cancel



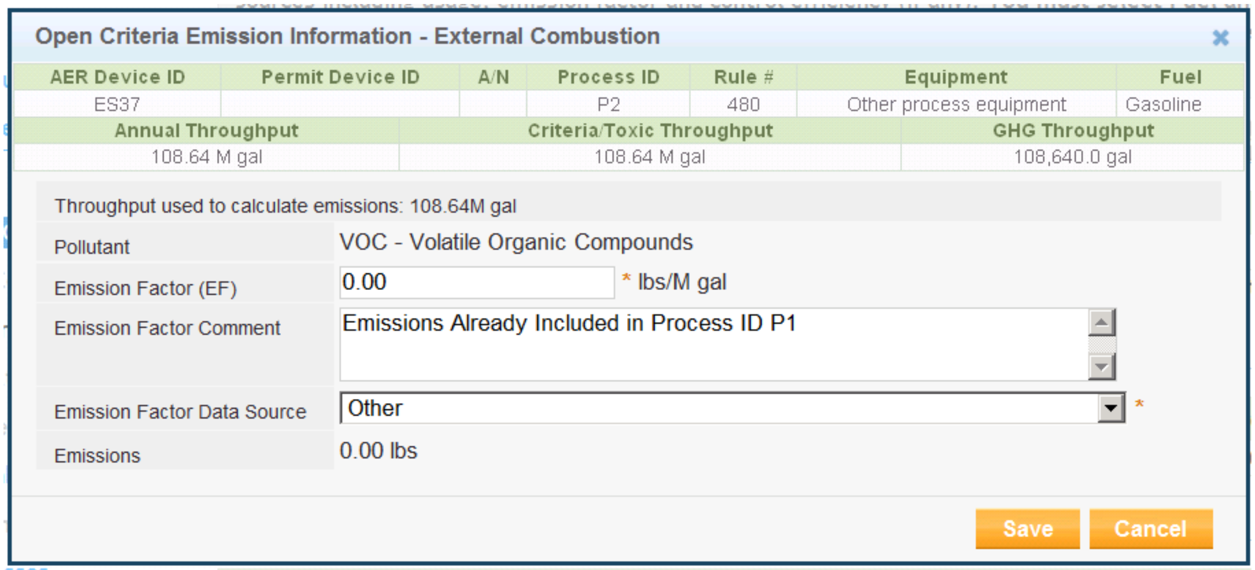
Edit Throughput Information - External Combustion

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Fuel Usage (Annual Throughput)	108.64 * M gal *
Throughput Type	Input *
Fuel Usage Comment	

Save Cancel



Open Criteria Emission Information - External Combustion

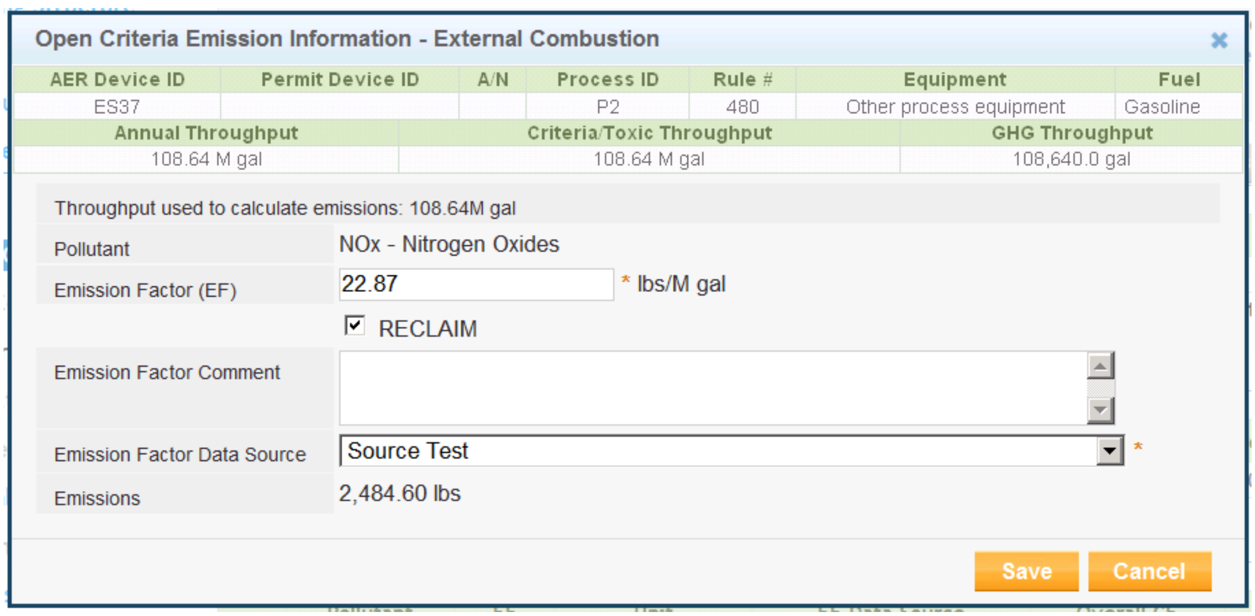
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	VOC - Volatile Organic Compounds
Emission Factor (EF)	0.00 * lbs/M gal
Emission Factor Comment	Emissions Already Included in Process ID P1
Emission Factor Data Source	Other *
Emissions	0.00 lbs

Save Cancel



Open Criteria Emission Information - External Combustion

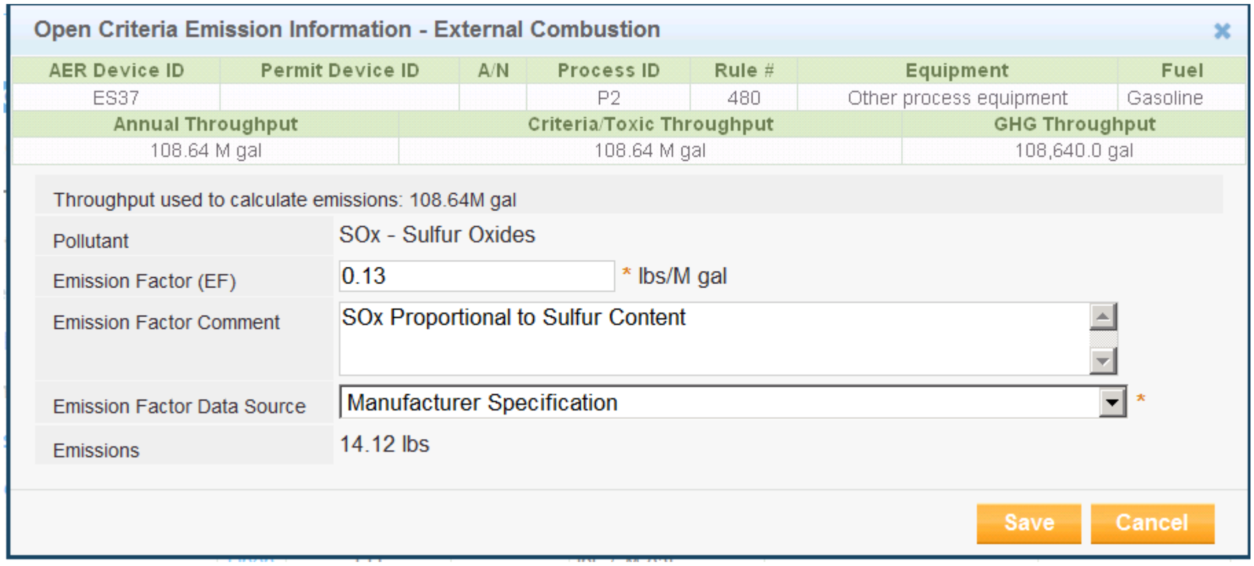
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	NOx - Nitrogen Oxides
Emission Factor (EF)	22.87 * lbs/M gal
	☑ RECLAIM
Emission Factor Comment	
Emission Factor Data Source	Source Test *
Emissions	2,484.60 lbs

Save Cancel



Open Criteria Emission Information - External Combustion

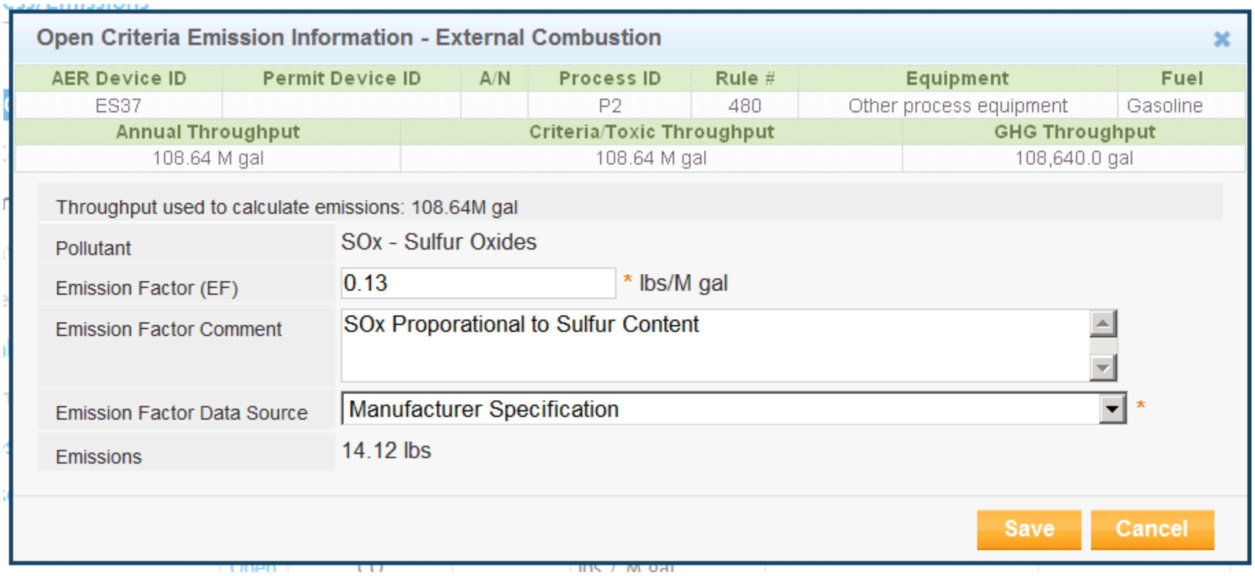
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	SOx - Sulfur Oxides
Emission Factor (EF)	0.13 * lbs/M gal
Emission Factor Comment	SOx Proportional to Sulfur Content
Emission Factor Data Source	Manufacturer Specification *
Emissions	14.12 lbs

Save Cancel



Open Criteria Emission Information - External Combustion

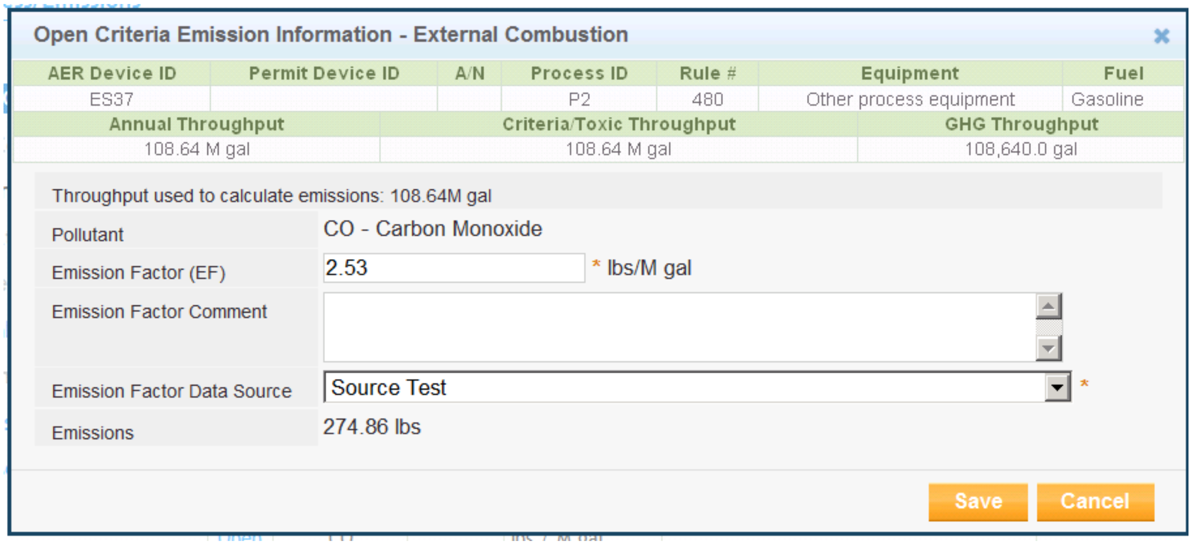
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	SOx - Sulfur Oxides
Emission Factor (EF)	0.13 * lbs/M gal
Emission Factor Comment	SOx Proporational to Sulfur Content
Emission Factor Data Source	Manufacturer Specification *
Emissions	14.12 lbs

Save Cancel



Open Criteria Emission Information - External Combustion

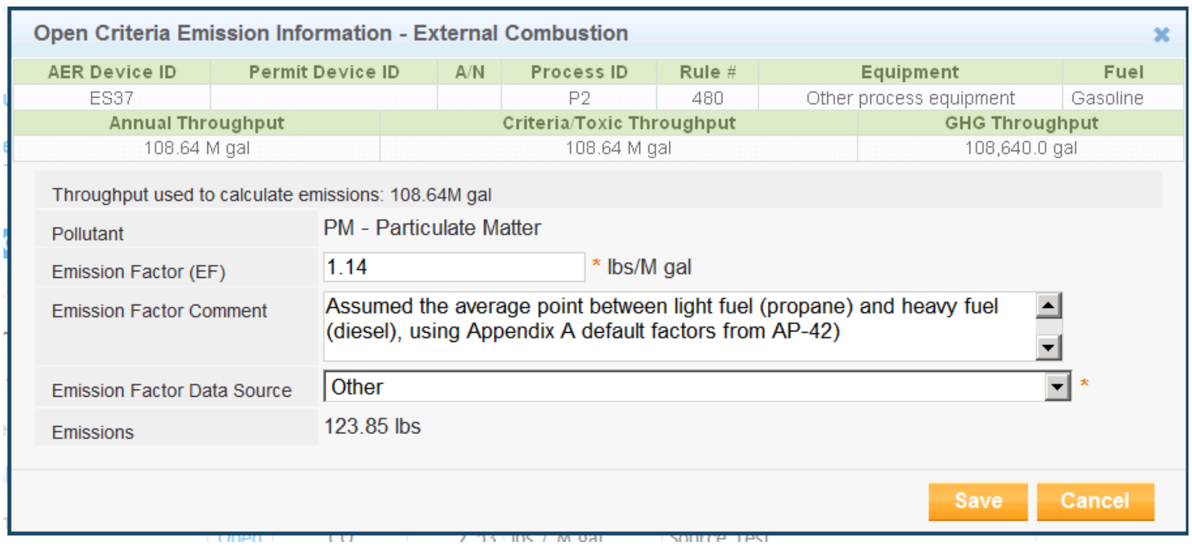
AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	CO - Carbon Monoxide
Emission Factor (EF)	2.53 * lbs/M gal
Emission Factor Comment	
Emission Factor Data Source	Source Test *
Emissions	274.86 lbs

Save Cancel



Open Criteria Emission Information - External Combustion

AER Device ID	Permit Device ID	A/N	Process ID	Rule #	Equipment	Fuel
ES37			P2	480	Other process equipment	Gasoline

Annual Throughput	Criteria/Toxic Throughput	GHG Throughput
108.64 M gal	108.64 M gal	108,640.0 gal

Throughput used to calculate emissions: 108.64M gal

Pollutant	PM - Particulate Matter
Emission Factor (EF)	1.14 * lbs/M gal
Emission Factor Comment	Assumed the average point between light fuel (propane) and heavy fuel (diesel), using Appendix A default factors from AP-42)
Emission Factor Data Source	Other *
Emissions	123.85 lbs

Save Cancel

Facilities must report toxic emission as well for this process. If default emission factors are needed, use the following, in pounds/1000 gallons of equivalent gasoline burned.

POLLUTANT	CAS NO.	EMISSION FACTOR
Benzene	71432	3.8061
1,3-Butadiene	106990	0.3240
Formaldehyde	50000	3.4520
Nickel	7440020	0.0033
PAHs	1151	0.1438